

WHAT IS CLAIMED IS:

1. A magnetron sputtering electrode for use with a magnetron sputtering device, the magnetron sputtering electrode comprising:
 - a cathode body;
 - a drive unit coupled to the cathode body;
 - a target received by the cathode body; and
 - a closed loop magnet arrangement received within a magnet receiving chamber and coupled to the drive unit, the closed loop magnet arrangement comprised of a plurality of magnets adapted for motion relative to the target by the drive unit, wherein at least one of the plurality of magnets is a profiled magnet having a contoured top portion.
2. The magnetron sputtering electrode as claimed in claim 1, wherein the plurality of magnets cooperate to generate magnet flux lines which form a closed loop magnetic tunnel adjacent to a front sputtering surface of the target.
3. The magnetron sputtering electrode as claimed in claim 1, wherein the target is one of a linear target and a circular target.
4. The magnetron sputtering electrode as claimed in claim 1, wherein the plurality of magnets is arranged on a support plate, wherein the support plate is coupled to a drive unit.
5. The magnetron sputtering electrode as claimed in claim 4, wherein the drive unit is comprised of at least one drive shaft and at least one motor, wherein the at least one drive shaft is coupled to the support plate and the at least one motor is coupled to the at least one drive shaft.
6. The magnetron sputtering electrode as claimed in claim 5, wherein activation of the at least one motor causes the loop magnet arrangement to rotate about an axis.

7. The magnetron sputtering electrode as claimed in claim 1, wherein the motion is one of concentric motion, eccentric motion, and linear motion.

8. The magnetron sputtering electrode as claimed in claim 7, wherein the motion further comprises two or more degrees of freedom of movement.

9. The magnetron sputtering electrode as claimed in claim 4, wherein the support plate includes channels for accommodating the plurality of profiled magnets.

10. The magnetron sputtering electrode as claimed in claim 4, further comprising one or more spacer blocks situated on the support plate.

11. The magnetron sputtering electrode as claimed in claim 1, wherein the form of the profiled magnet is one of a rectilinear form and a cylindrical form.

12. The magnetron sputtering electrode as claim in claimed 1, wherein the contoured top portion is one of an angled shape, sloped shape, conical shape, parabolic shape, convex shape, and a concave shape.

13. A magnetron sputtering electrode for use with a magnetron sputtering device, the magnetron sputtering electrode comprising:

a cathode body;

a drive unit coupled to the cathode body, wherein the drive unit is comprised of a drive shaft and a motor;

a target received by the cathode body; and

a closed loop magnet arrangement comprised of an inner assembly and an outer assembly, the inner assembly and the outer assembly comprised of a plurality of profiled magnet segments, wherein each of the profiled magnet segments includes a contoured top portion, wherein the closed loop magnet arrangement is situated beneath the target and is coupled to the drive shaft, wherein the drive shaft is adapted to rotate the closed loop magnet arrangement in relation to the target.

14. The magnetron sputtering electrode as claimed in claim 13, wherein the contoured top portion comprises an apex that is flat, wherein the apex is up to half the thickness of the magnet segment.

15. A method of improving target utilization in sputtering applications, the method comprising:

providing a substrate;

providing a cathode body;

providing a target received by the cathode body;

providing a closed loop magnet arrangement within a magnet receiving chamber, the closed loop magnet arrangement comprised of a plurality of magnets, wherein at least one of the plurality of magnets is a profiled magnet having a contoured top portion;

moving the closed loop magnet arrangement in relation to the target;

obtaining target material from the target; and

depositing the target material on the substrate.

16. The method of claim 15, wherein the contoured top portion includes an apex that is flat.

17. The method of claim 16, wherein the contoured top portion is adapted to direct magnetic flux lines to a front sputtering surface of the target.

18. The method of claim 15, further comprising a motor, wherein the motor rotates the closed loop magnet arrangement.

19. The method of claim 16, wherein the apex is up to half the thickness of the magnet segment.